

**A critical appraisal of “Testing the feasibility and safety of the
Nintendo Wii gaming console in orthopedic rehabilitation: a pilot
randomized controlled study ”**

By

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Abstract

The Nintendo Wii is a gaming device, which requires the movement and skill of performing a task in reference to a visual field. It is mostly used for recreational gaming, but recently in the field of physical therapy, has seen its role increase in demand. This critical appraisal was done as a research topic to study and compare standard physical therapy against Nintendo Wii virtual gaming in ACL injured patients. The purpose of this study was to not only compare the two and show which yielded better results, but also to show that the Wii aspect of therapy would yield no hurtful or negative consequences when it came to therapy. There were 30 subjects in the study, 13 of which were part of the control group (standard physical therapy), the other 17 were a part of the experimental group (Wii Physical therapy). The subjects were tested on 3 different occasions, before their surgery, right after their surgery, and 4 weeks after the post-operation session. The results showed that even though there was a slight edge in scores for the Nintendo Wii therapy, the results were not conclusive enough to show that one was significantly better than the other. However, it is also reported in the study that the virtual physical therapy had a positive experience with the subjects. The article starts and concludes by showing that even though Nintendo Wii gaming is a new aspect of orthopedic rehabilitation, the ground is laid for the advancement of future similar studies, practices, and techniques to come.

Key words: Rehabilitation, Nintendo Wii, Orthopedic Physical Therapy

Introduction

The purpose of this appraisal was to show the benefits of Wii rehabilitation on ACL tears, compared to standard physical therapy. This is important as physical therapy is an ever-changing field. Therefore, different and new innovative tasks and avenues in the field rise, and it is up to us as clinicians to adapt. The clinical question for my research is as follows: “Would Wii virtual gaming simulation have a better impact on balance and coordination for neurological patients aged 13-19 versus standard physical therapy techniques?”.

Methods

The database and search engines I used were U-Search and PubMed. The keywords used were as follows: “Wii gaming”, “Physical Therapy”, and “Balance”. I would say that when searching, I was able to see or experience any limitations. I found quite a bit of evidence due to there being many studies done on the topic already. My preliminary search resulted with 215 hits. I limited my article searches to “ACL tears” and “Wii Therapy”

The article was conducted in Munich, Germany at the Department of Orthopedic Surgery, located at the University Hospital of Munich. The authors are as follows: Andreas Ficklscherer, Jonas Staph, Kay Michael Meissner, Thomas Niethammer, Matthias Lahner, Markus Wagenhauser, Peter E. Mueller, Matthias F. Pietschmann. This article was both submitted and published in the year 2014. The source of journal was the Arch Med Sci. My appraisal question dealt with Nintendo Wii gaming of neurological patients. This specific article is related to ACL patients both pre and post operation. Instead of focusing on the effects of Wii rehabilitation on

balance and coordination for Neuro patients, I thought it would be appropriate to get a foundational knowledge for Nintendo Wii gaming in a standard fashion first.

Results

Summary of the study

The article's goal was to compare standard physical therapy (control group) vs. the Nintendo Wii physical therapy subjects (experimental group). Every subject was treated 3 different times, pre-operation, post-operation, and an assessment 4 weeks later. The subjects were also asked to perform a satisfaction questionnaire in which they were instructed to give a 1 to 10 grade on the study itself. With respect to the results, there was a slightly better outcome that favored the Wii rehabilitation. However, it was not enough to conclude that the Wii gaming is the much better choice of therapy, as it was not statistically significant in scoring.

Appraisal of the study introduction

One of the strengths of the introduction is that it establishes the importance of the study. Wii rehabilitation has been done in the neurological field of physical therapy, but also make it an effort to show the revolutionary potential to bring virtual rehabilitation to the orthopedic population. The authors also go on to discuss the purpose of the article, which is to demonstrate that not only would virtual therapy show more positive results than standard therapy, but also to show that it would be safe and have no negative effects or influences on the healing process.

There are some negatives to the introduction. I have the notion that it gave decent background information, however, I felt it was not enough to provide the reader with a great synopsis and foundation of past research on the topic and future testing strategies. I would have liked if the authors discussed

more of the effects of Nintendo Wii gaming and its effects on orthopedic rehabilitation. My research question deals with the neurological aspect, but with respect with this topic I would have liked to see more.

Appraisal of the study methods

Positives of the methods section are that I believe it could be understood by anyone with no background in the topic. The language is understandable and well written. The authors also painted a picture in which they were essentially stating instructions, if someone else wanted to replicate the study. With that being said, the methods section, again, was brief and concise.

One of the negatives of the methods was that it does not state whether they were blinded to the group assignment or not. I would assume they were because the Wii group was to receive more therapy than the control group. Depending on if they were blinded or not could alter the results and feedback from either or both groups. It also does not mention whether the clinicians were blinded.

Appraisal of the study results

The results section is clear and organized. The author does a good job of restating and giving a brief synopsis of the procedures so that the reader can understand the process by which the results would be stated in. The authors start with the primary/main outcomes measures, and then go and speak on the secondary ones. Another strength is that the figures and tables are presented in a very clear, and formal sense. They then separate into two tables and show the control group vs. the Wii group. Both tables are subdivided into the different stages in which they are tested. The graph clearly shows how the numbers tend to side with the Wii group having a better improvement with physiotherapy over the control group.

The drawbacks of the results section would be that the authors could have given a background on the importance of the scores and rating systems. As someone who does not have a strong statistical background, I would like to know the importance and maybe a general, brief synopsis of what I am looking at. For instance the authors compare the IKDC, Cincinnati, and the Tegner Lysholm. All three tests gave slightly different results. As the reader, if I would want to reproduce this study I would like to know the differences and statistically which is universally known to give the best or worst results.

Appraisal of the study discussion

The authors did a great job of further indicating the meaning of the results. They reiterated that the idea of the study was to show that the Wii does not have negative effects on the patient's healing process. The author also goes on to further indicate with the results that not only through objective feedback, but subjective feedback as well the Wii gaming was slightly preferred. This in essence lays the groundwork for additional Wii therapy to be installed not only in clinics, but utilized for home-based therapy as well.

After reviewing this article I felt that the authors had no weaknesses in the discussion. The discussion was the best piece of the entire article. As previously mentioned, the authors do a great job of summarizing the study, offering the limitations, stating there are no conflicts of interests, and offering the notion that this study is groundwork for the future of virtual rehabilitation in the branch of physical therapy that is orthopedic rehabilitation.

Discussion

The article is a great example of an application to physical therapy today. Physical therapy as we know is an ever-changing field. With that being said, technology is a key factor in physical therapy that will always change. The aspect of physiotherapy in which this article addresses allows for the electronic and virtual aspect of therapy and rehabilitation to be looked into the Nintendo Wii console allows for the aspects of motor control, gait, locomotion, etc. all to be utilized for an individual, which is extremely relevant to physical therapy as this is what most of the problems therapists come across on a daily basis in dealing with patients. This article is closely related to my question, although not completely. This article deals more so with an orthopedic aspect of physiotherapy. Meanwhile, my clinical question deals more so with the neurological aspect. The age of the subjects is also a bit different. The subjects in my clinical questions were in the 13-19 age group. Meanwhile the individuals in this category deal with the age range of 54+-19.

I have high praise for this article and support it as a cornerstone of future studies in this field. This is extremely beneficial for adding to the clinical setting. It provides a more hands on, fun, and more extrinsically applied approach. As time goes on, everyday people will come across technology more frequently that will replace outdated manual techniques of everyday living. We as physical therapy professionals must be willing to understand that technology adds a new dimension to everyday life. If we are adding it to everyday life then why not use it as a rehabilitation tool to promote well-being before, or even after injury. There are not many potential risks to this intervention. The safety of a Wii is within the realm of what a clinician can control to prevent falls, exhaustion, etc., just as in a normal therapy session. Drawbacks or arguments could be that the Wii approach can be physically exhausting for a person compared to

traditional therapy, especially to those who have had an ACL injury, as they are essentially immobile on one of their lower extremities. Another drawback could be with the respect of documentation. For instance, how a therapist should document for activities that don't have specific measureable outcomes.

As of right now, I would say that I have enough confidence in my ability to conduct this experiment. I am versed with gaming and see a very large market and future for virtual therapy and rehabilitation. I am a huge proponent in putting a spin on certain tasks and ways of practice I consider outdated. I could, and actually do see myself implementing virtual therapy in my practice. With where healthcare is going, a lot of what clinicians do is becoming more and more electronic based. By the time, I become a clinician myself; the virtual gaming side of therapy might be evolved to the point in which it is vastly utilized.

In conclusion, I see nothing but the sky being the limit for the Nintendo Wii gaming side of physical therapy to be used. As previously mentioned, it is being used in the neurological, but the use in orthopedic field is increasing. This article does a good job at laying the groundwork for future work to come. It is an exciting time to be in the rehabilitation field as a whole and we are always looking for way to improve.